

STUDY OF THE RELATIONSHIP BETWEEN HEAD SPACE AND RESULTANT VACUUM

Aim:

To study how the vacuum produced in can varies with the headspace.

Introduction:

Gross headspace is measured in mm of height. The distance from cutout top edge of seam to food surface is known as "**Gross head space**". Formula of Gross headspace is as follows;

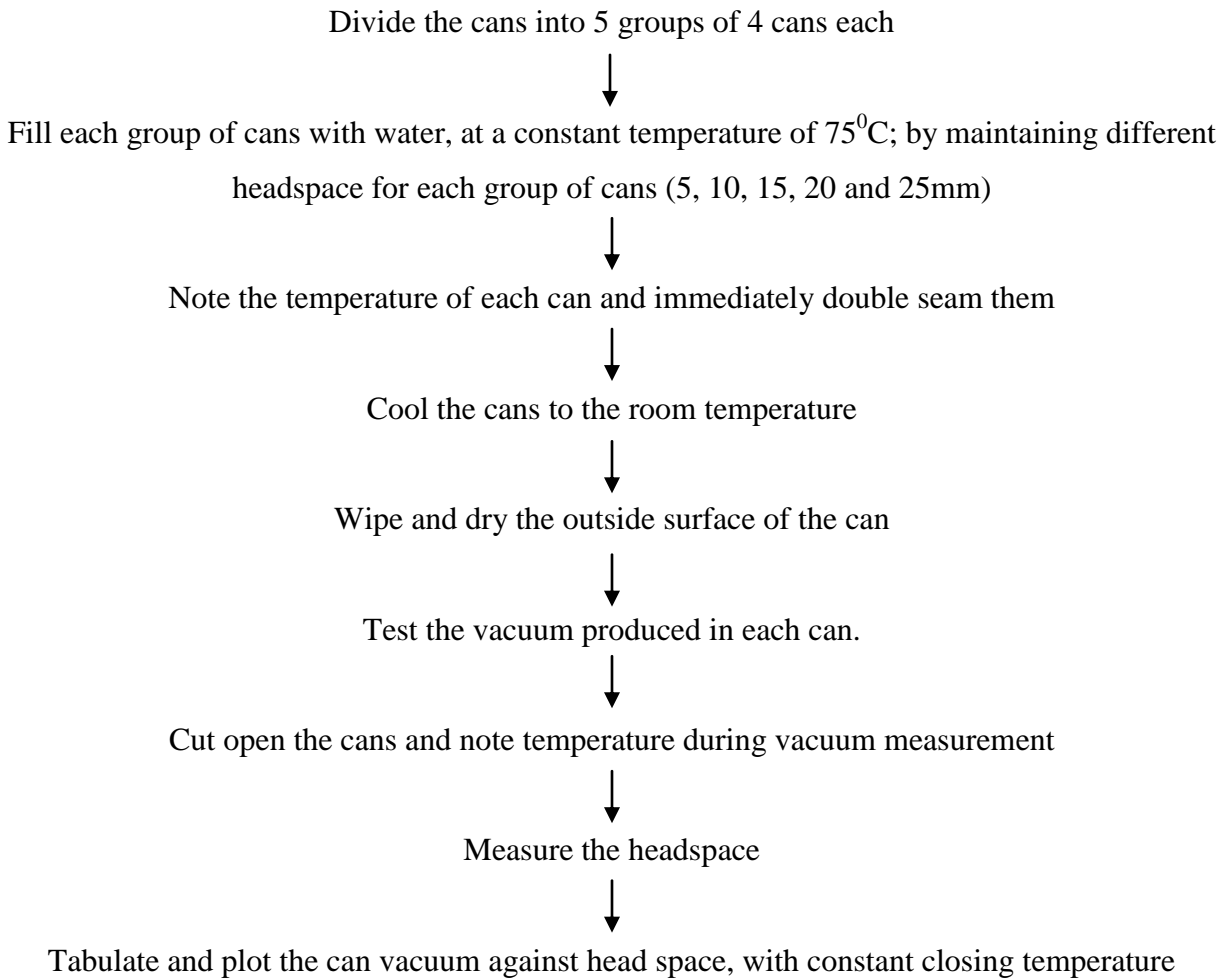
$$\text{GHS} = \text{NHS} + \text{Tc} + \text{Cs}$$

Where: **GHS** = Gross head space **NHS** = Net head space
Tc = Thickness of cover plate **Cs** = Countersink depth

Net head space is distance between from the inner surface of Lid to food surface is called as "**Net head space**" proper headspace has to be maintained while filling the can with solid materials, so as to accommodate the expansion of the product during retorting and achieve successful exhausting process in producing maximum vacuum. Among the various factors affecting the production of resultant vacuum, headspace plays a vital role. In the exhaust box method, the degree of vacuum produced increases with the increase in the headspace. On the other hand in hot filling method, increase in head space generally decreases the degree of vacuum produced, since the amount of water vapour present in the head space is responsible for the resultant vacuum.

Materials and Equipment:

20 empty cans (1 lb. Jam), water for filling, heated to certain temperature, physical balance, seaming machine, scale, vacuum gauge, thermometer etc.

Procedure:**Observations:**

Size of the cans used for the experiment

Number of groups made

Number of cans selected in each group

Different head space selected

Tabulation:

Group	Head Space (mm)	Temperature (75⁰C)	Can closing temperature (0⁰C)	Can vacuum (cm)
I	1			
	2			
	3			
	Average			
II	1			
	2			
	3			
	Average			
III	1			
	2			
	3			
	Average			
IV	1			
	2			
	3			
	Average			
V	1			
	2			
	3			
	Average			

Note:

- 1) Average values of 3 observations in each group may be noted after 1,2,3,4 - in all cases.
- 2) In the above experiment only the '*hot fill*' method is used.
- 3) GHS may be 5 to 7.5 mm in small sized cans.
10 to 16 mm in medium sized cans
21 mm or more in larger sized cans